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**Replacement
Parts List
and
Service Manual
Model V-80_{TR}
ATOM TRANSPORT INCUBATOR**

Printed in Sep. 1999

ATOM MEDICAL CORPORATION

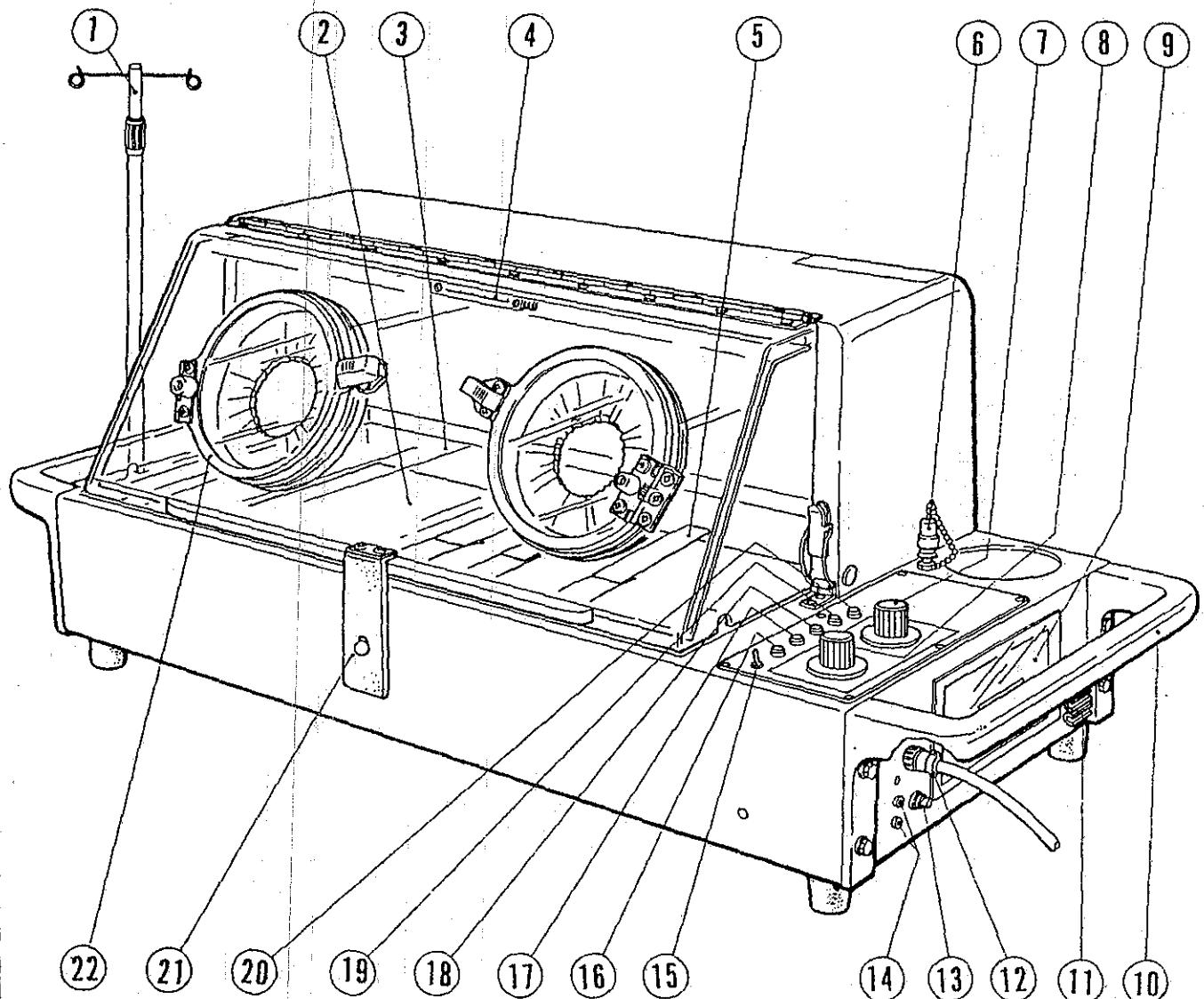
3-18-15, Hongo, Bunkyo-ku, Tokyo, Japan.

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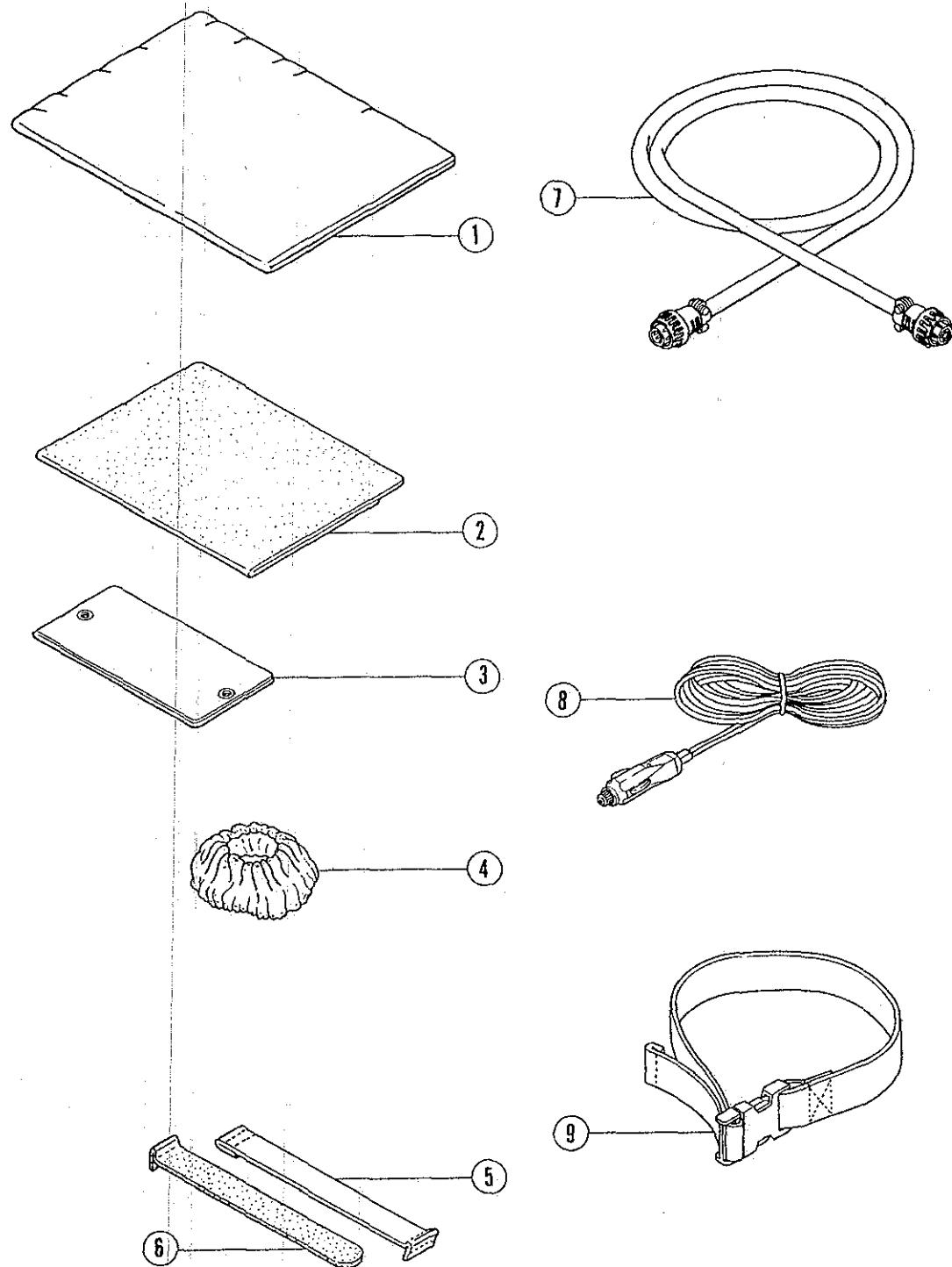
SERVICE MANUAL

[1] General View [Transport Incubator]

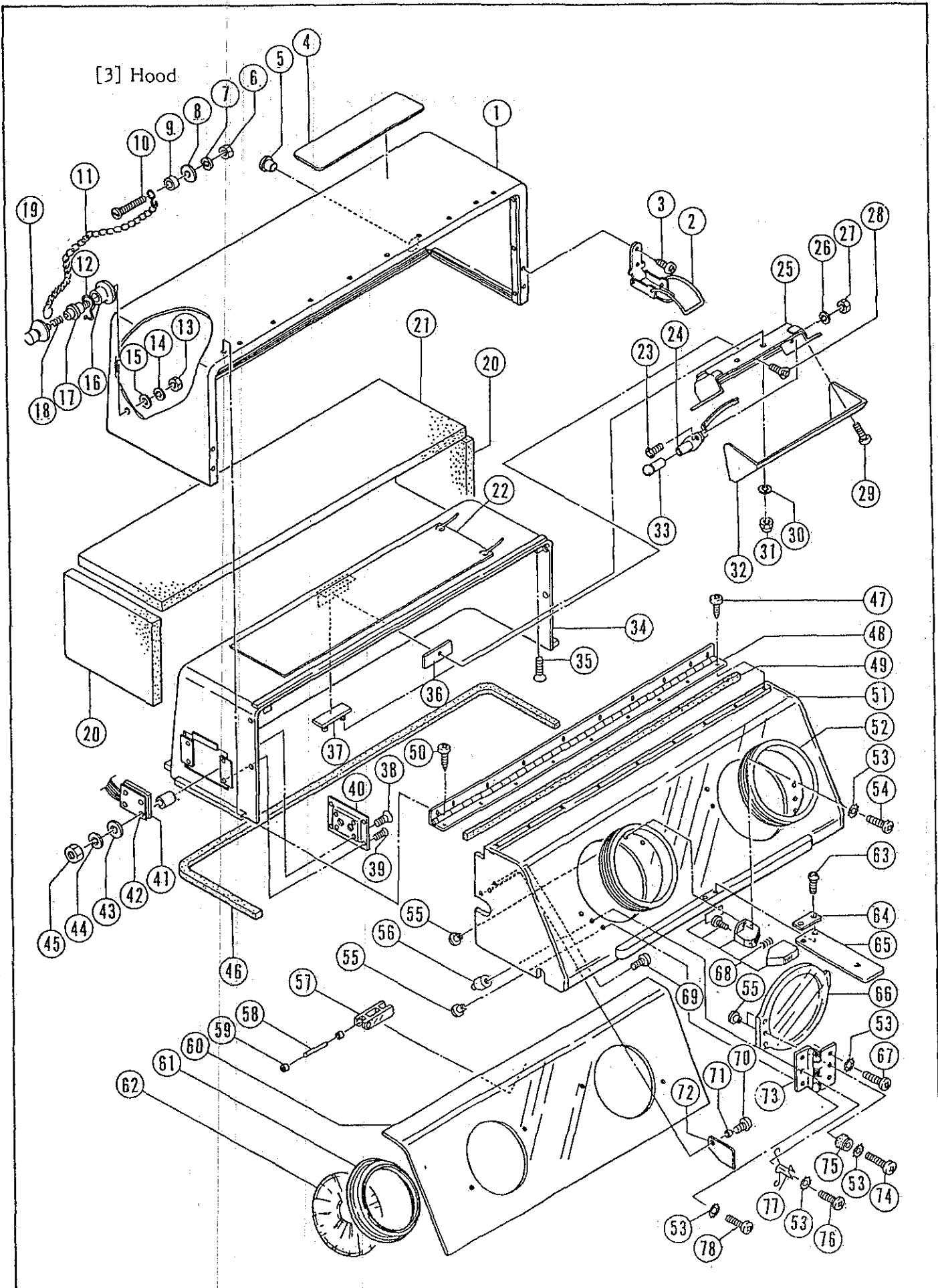


<u>No.</u>	<u>Part Name</u>	<u>Remark</u>
1.	I.V. pole	
2.	Mattress	
3.	Mattress platform	
4.	Thermometer	Indication of temperature inside incubator
5.	Infant restrainer strap	3 sets
6.	Oxygen supply port	
7.	Incubator temp. adjust dial	
8.	Power switch	
9.	Filter cover	
10.	Handle	On right and left sides
11.	Spare fuse	10 A, two
12.	Power input connector	
13.	Circuit breaker	6 A
14.	Over-temp. test terminal	Over-temp. IC sensor test and adjustment
15.	Infant illuminator switch	
16.	Incubator ON indicator lamp	
17.	Auxiliary warming indicator lamp	
18.	Low voltage alarm lamp	Low power voltage alarm
19.	Over-temp. alarm lamp	Over-temperature alarm
20.	Heater indicator lamp	
21.	Access window stopper	
22.	Access port	Can be opened or closed by elbow, etc.

[2] Accessories



<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
1.	Dust cover	803 - 1001
2.	Humidifying sponge (L)	803 - 1002
3.	Filter element	803 - 1003
4.	Access port cover (semi-iris)	803 - 1004
5.	Infant restrainer strap (male)	803 - 1005
6.	Infant restrainer strap (female)	803 - 1006
7.	Connecting cord	803 - 1007
8.	Car plug	803 - 1009
9.	Body restrainer strap	803 - 1010

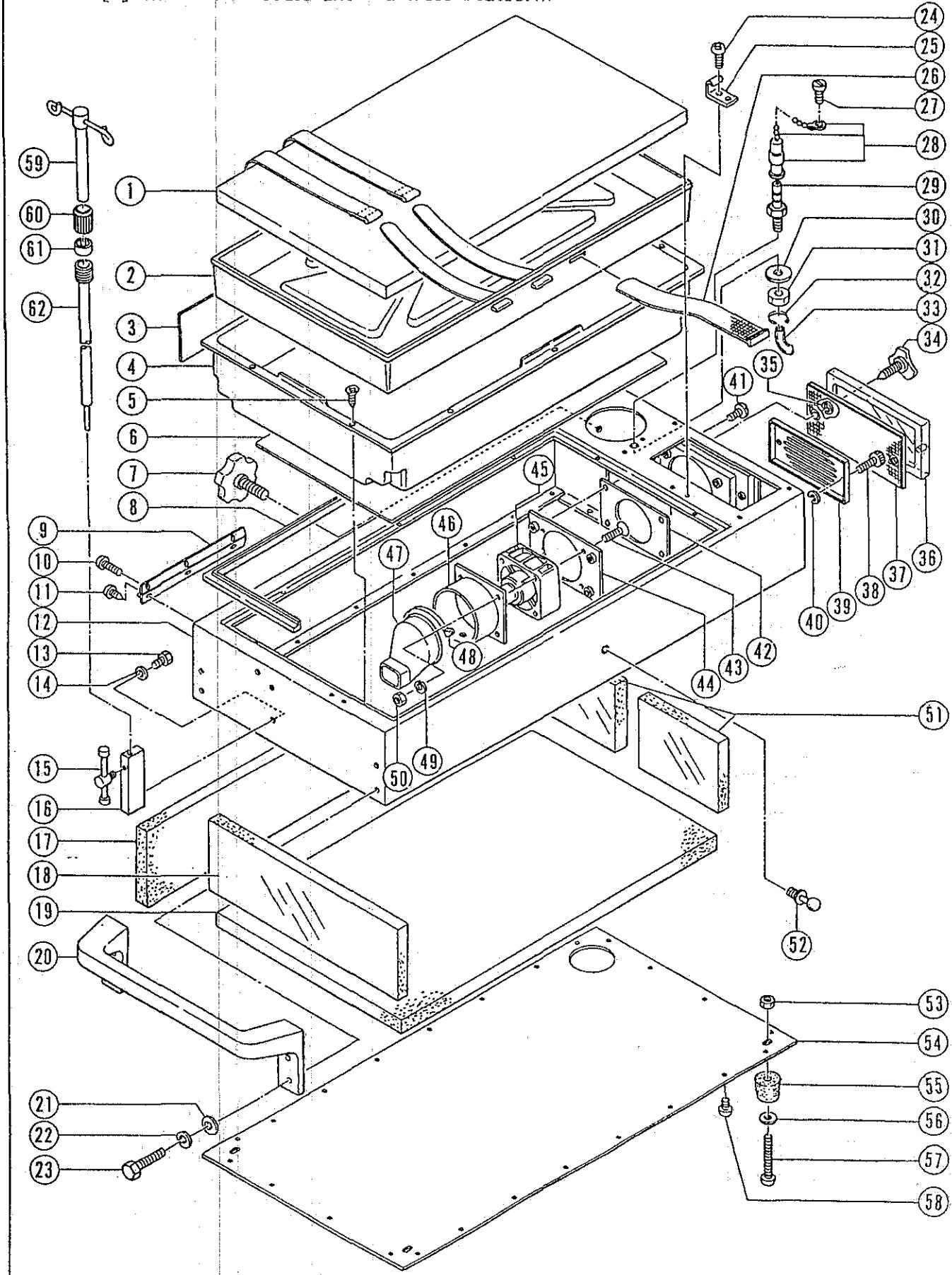


<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
1	Outer hood	803-0101A
2	Snap lock	803-0108
3	Tapping bind screw M3x10	351-0310
4	Standby heating plate	803-0106
5	Cord retainer bushing	803-0107
6	Nut M5	002-0500
7	Spring washer $\phi 5$	021-0500
8	Plain washer $\phi 5$	061-0500
9	Locker chain fixing nut	803-0109
10	Locker chain fixing screw	803-0110
11	Locker chain (with cover)	803-0111
12	Locker chain S-fitting	803-0112
13	Nut M5	002-0500
14	Spring washer $\phi 5$	021-0500
15	Plain washer $\phi 5$	061-0500
16	Locker chain holder nut	803-0113
17	Locker chain holder	803-0114
18	Locker chain spring	803-0115
19	Locker chain slider	803-0116
20	Heat insulator (hood side)	803-0805
21	Heat insulator (hood top)	803-0804
22	Heater (hood top)	803-0801
23	Truss head screw M3x8	202-0308
24	Lamp socket	803-0703
25	Observation light reflector	803-0702
26	Spring washer $\phi 3$	021-0300
27	Nut M3	002-0300
28	Round counter-sunk tapping screw M3x6 (cross-recessed)	365-0306
29	Truss head screw M3x6	202-0306

No.	Part Name	Part No.
30	Spring washer φ3	021-0300
31	Cap nut M3	012-0300
32	Observation light cover	803-0701
33	Observation light	803-0704
34	Inner hood	803-0102A
35	Counter-sunk tapping screw M3x15 (cross-recessed)	305-0315
36	Observation light mounting plate (B)	803-0706
37	Observation light mounting plate (A)	803-0705
38	Round counter-sunk screw M3x10	242-0310
39	Round counter-sunk tapping screw M3x6	365-0306
40	Sensor holder	803-0103
41	PC board (Temp sensor)	803-0104
42	Insulating paper	803-0105
43	Plain washer φ3	061-0300
44	Spring washer φ3	021-0300
45	Nut M3	002-0300
46	Hood gasket	803-0118
47	Tapping bind screw (cross-recessed)	351-0310
48	Access port hinge	M3x10 803-0323
49	Seal gasket	803-0309A
50	Tapping bind screw (cross-recessed)	351-0316
51	Access port	M3x16 803-0301A
52	Access port packing	803-0324
53	Washer (internally toothed) φ3	031-0300
54	Truss head screw M3x7	201-0307
55	Flanged nut	803-0325
56	Panel mounting boss	803-0326
57	Thermometer holder	803-0305
58	Thermometer	803-0306
59	Thermometer fastening ring	803-0307

<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
60	Access port panel	803-0302A
61	Access port ring	803-0303A
62	Access port cover (semi-iris)	803-0304
63	Truss head screw M3x8	202-0308
64	Stopper band retainer	803-0312
65	Access window stopper	803-0313
66	Access port lid	803-0317A
67	Truss head screw M3x8	201-0308
68	Hook slider	803-0314A
69	Oval head screw M3x4	228-0304
70	Truss head screw M4x8	202-0408
71	Tubing throttle collar	803-0319
72	Tubing throttle	803-0320
73	Access port hinge	803-0319A
74	Truss head screw M3x15	201-0315
75	Access port rubber cushion	803-0320A
76	Truss head screw M3x10	201-0310
77	Auxiliary spring	803-0327
78	Truss head screw M3x7	201-0307

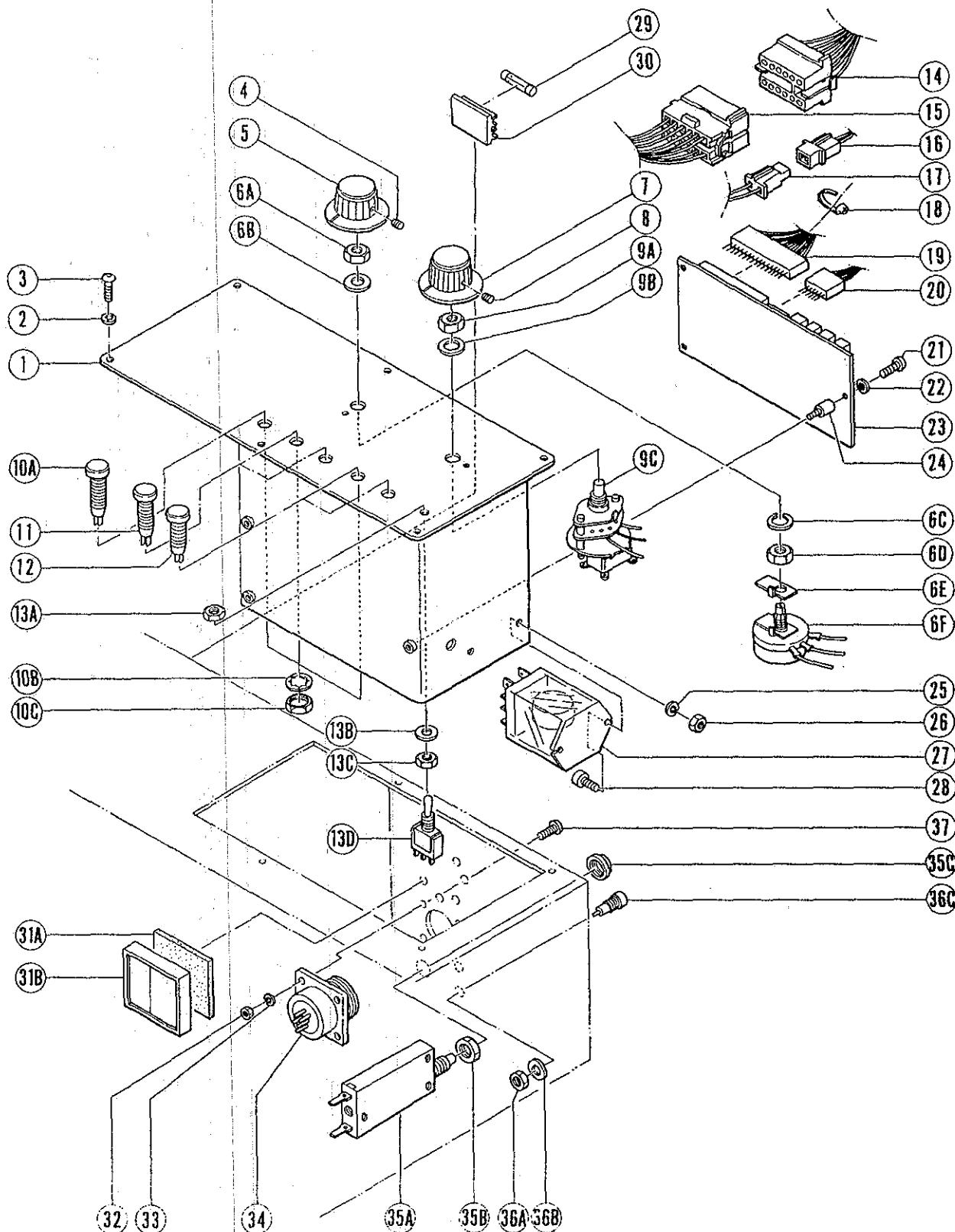
[4] Incubator Module and Mattress Platform



No.	Part Name	Part No.	Parker P/N
1	Mattress \$137.50	803-0401 92756	6811
2	Mattress platform \$68.2	803-0402 92755	6844
3	Heater (Conditioning chamber front and rear side) \$410	803-0802 803-8802	
4	Conditioning chamber \$737	803-0404	
5	Tapping counter-sunk screw M3x10	301-0310	
6	Heater (Conditioning chamber bottom)	803-0803	
7	Cylinder retaining screw	803-0211	
8	Unit body frame gasket	803-0206	
9	Unit body hinge	803-0205A	
10	Tapping bind screw (cross-recessed)	355-0315	
11	Tapping bind screw M3x10	351-0310	
12	Shell	803-0201	
13	Hex bolt M5x10	252-0510	
14	Spring washer #5	021-0500	
15	I.V. pole fastening screw	803-0212	
16	I.V. ple retainer	803-0213	
17	Heat insulator (front and rear of shell)	803-0806	
18	Heat insulator (left side of shell)	803-0807	
19	Heat insulator (bottom of shell)	803-0809	
20	Handle	803-0214	
21	Plain washer #6	061-0600	
22	Spring washer #6	021-0600	
23	Hex bolt M6x25	251-0625	
24	Tapping bind screw M3x10	351-0310	
25	Snap lock fitting	803-0207	
26	Infant restraining strap	803-0403	
27	Bead chain retaining screw	803-0208	
28	Bead chain	803-0209	
29	Oxygen supply port	803-0210	

<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
30	Plain washer $\phi 8$	065-0800
31	U-nut M8	085-0800
32	TY-RAP	803-0215
33	Oxygen connecting tube	803-0216
34	Filter cover mount screw	803-0605
35	E-ring	101-0500
36	Filter cover	803-0602
37	Filter element	803-0601
38	Filter cover mount screw	803-0604
39	Fan cover	803-0603
40	E-ring $\phi 4$	101-0400
41	Truss head screw M4x8	202-0408
42	Vibration absorbing gasket	803-0503
43	Counter-sunk screw	232-0335
44	Fan holder	803-0502A
45	Fan motor	803-0501A
46	Air pipe	803-0506
47	Air supply joint	803-0504
48	TY-RAP	803-0505
49	Spring washer $\phi 3$	021-0300
50	Nut M3	002-0300
51	Heat insulator (right side of shell)	803-0808
52	Hook stopper	803-0204
53	Nut M4	002-0400
54	Bottom plate	803-0202
55	Rubber cushion	803-0203
56	Plain washer $\phi 4$	061-0400
57	Round head screw M4x25	222-0425
58	Round head screw M3x4	222-0304
59	I.V. pole	803-0217
60	Clamping screw	803-0218
61	Clamping screw	803-0219
62	I.V. pole support	803-0220

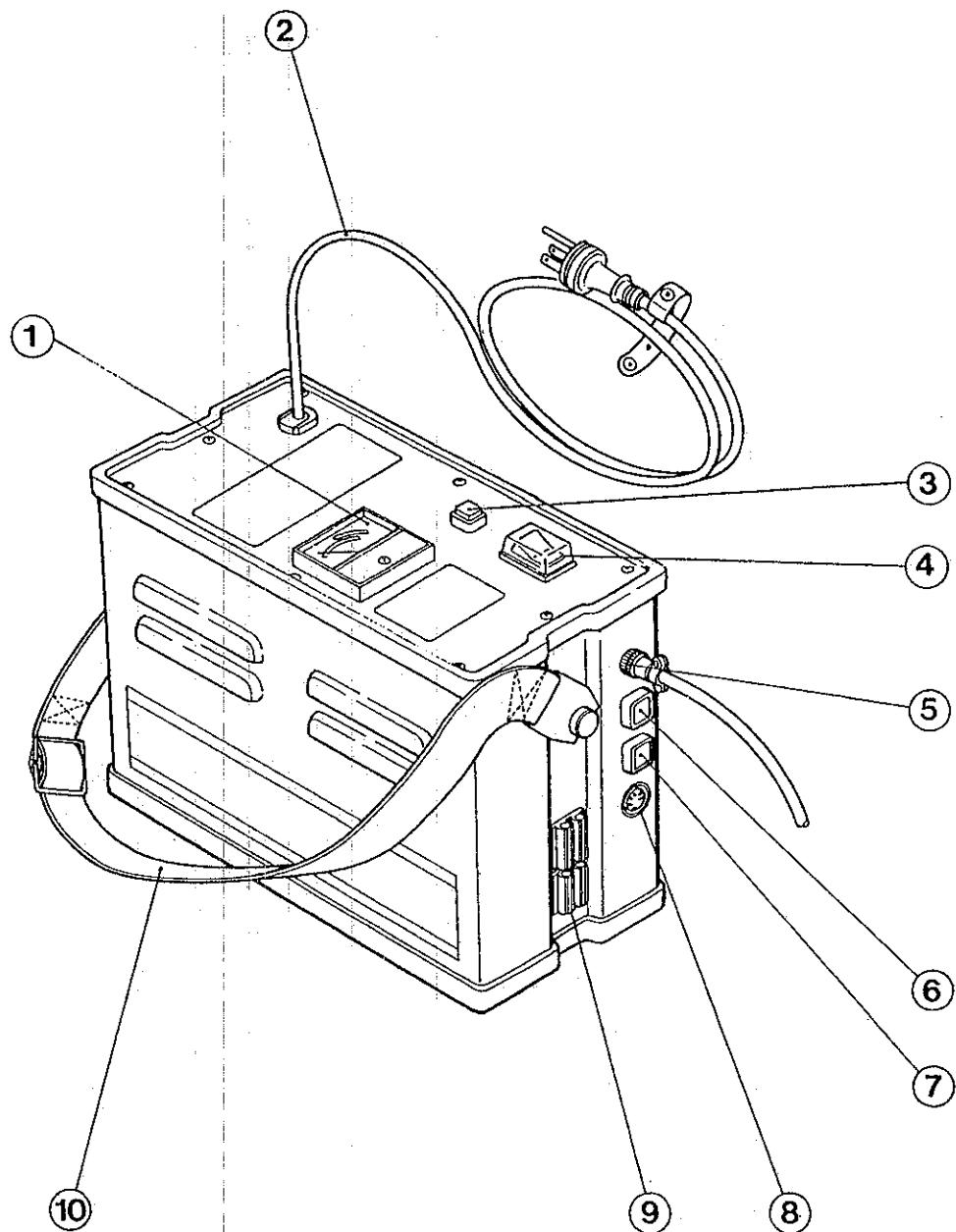
[5] Power Unit



<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
1.	Power panel	803 - 0901
2.	Toothed lock washer #3	031 - 0300
3.	Truss head screw with hex, hole	803 - 0926
4.	Set screw M3x3	267 - 0303
5.	Incubator temp. adjust dial	803 - 0902
6.	Dial assembly	803 - 0903
6A	Dial nut	
6B	Plain washer	
6C	Spring washer	
6D	Dial nut	
6E	Dial retaining plate	
6F	Dial body	
7.	Power switch	803 - 0904
8.	Set screw M3x3	267 - 0303
9.	Switch assembly	803 - 0905
9A	Switch nut	
9B	Plain washer	
9C	Switch body	
10.	Indicator lamp (orange) assembly	803 - 0906
10A	Indicator lamp body	
10B	Nut	
10C	Toothed lock washer	
11.	Indicator lamp (red) assembly	803 - 0907
12.	Indicator lamp (green) assembly	803 - 0908
13.	Illuminator switch assembly	803 - 0909
13A	Switch nut	
13B	Plain washer	
13C	Switch nut	
13D	Switch body	
14.	Connector 10P (socket)	803 - 0922
15.	Connector 10P (plug)	803 - 0923
16.	Connector 2P (socket)	803 - 0924
17.	Connector 2P (plug)	803 - 0925
18.	Tiewrap	803 - 0915
19.	Connector 18P	803 - 0913

<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
20.	Connector 7P	803 - 0914
21.	Bind screw M4x8	212 - 0408
22.	Spring washer $\phi 4$	021 - 0400
23.	Base board	803 - 0911
24.	Base board mount boss	803 - 0912
25.	Spring washer $\phi 4$	021 - 0400
26.	Nut M4	002 - 0400
27.	Relay	803 - 0910
28.	Bind screw M4x8	212 - 0408
29.	Spare fuse for car plug	803 - 0920
30.	Spare fuse holder	803 - 0921
31.	Buzzer assembly	803 - 0916
31A	Buzzer mount sponge	
31B	Buzzer body	
32.	Nut M3	002 - 0300
33.	Spring washer $\phi 3$	021 - 0300
34.	Power input connector	803 - 0917
35.	Circuit breaker assembly	803 - 0918
35A	Breaker body	
35B	Adjust nut	
35C	Fastening nut	
36.	Over-temp. test terminal assembly	803 - 0919
36A	Nut	
36B	Plain washer	
36C	Over-temp. test terminal body	
37.	Truss head screw M3x10	202 - 0310

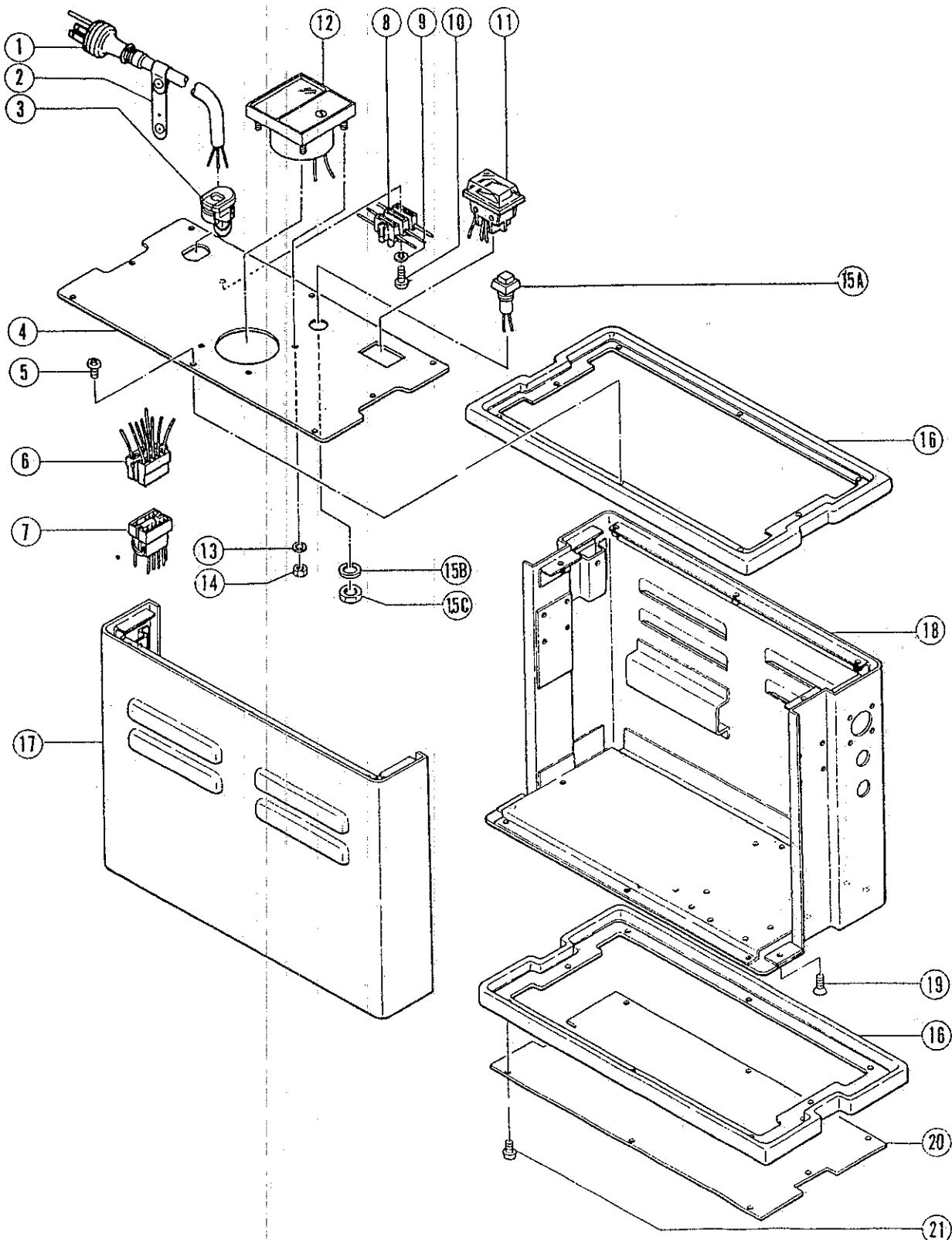
[6] General View [Power Pack]



<u>No.</u>	<u>Part Name</u>	<u>Remark</u>
1.	Charging indicator	
2.	Power cord	
3.	Battery check button	
4.	Power switch	
5.	Power output connector	DC 12 V
6.	Output fuse holder	8 A
7.	Input fuse holder	2 A
8.	Auxiliary power connector	DC 12 V
9.	Spare fuse	Two 2 A & Two 8 A
10.	Shoulder strap	

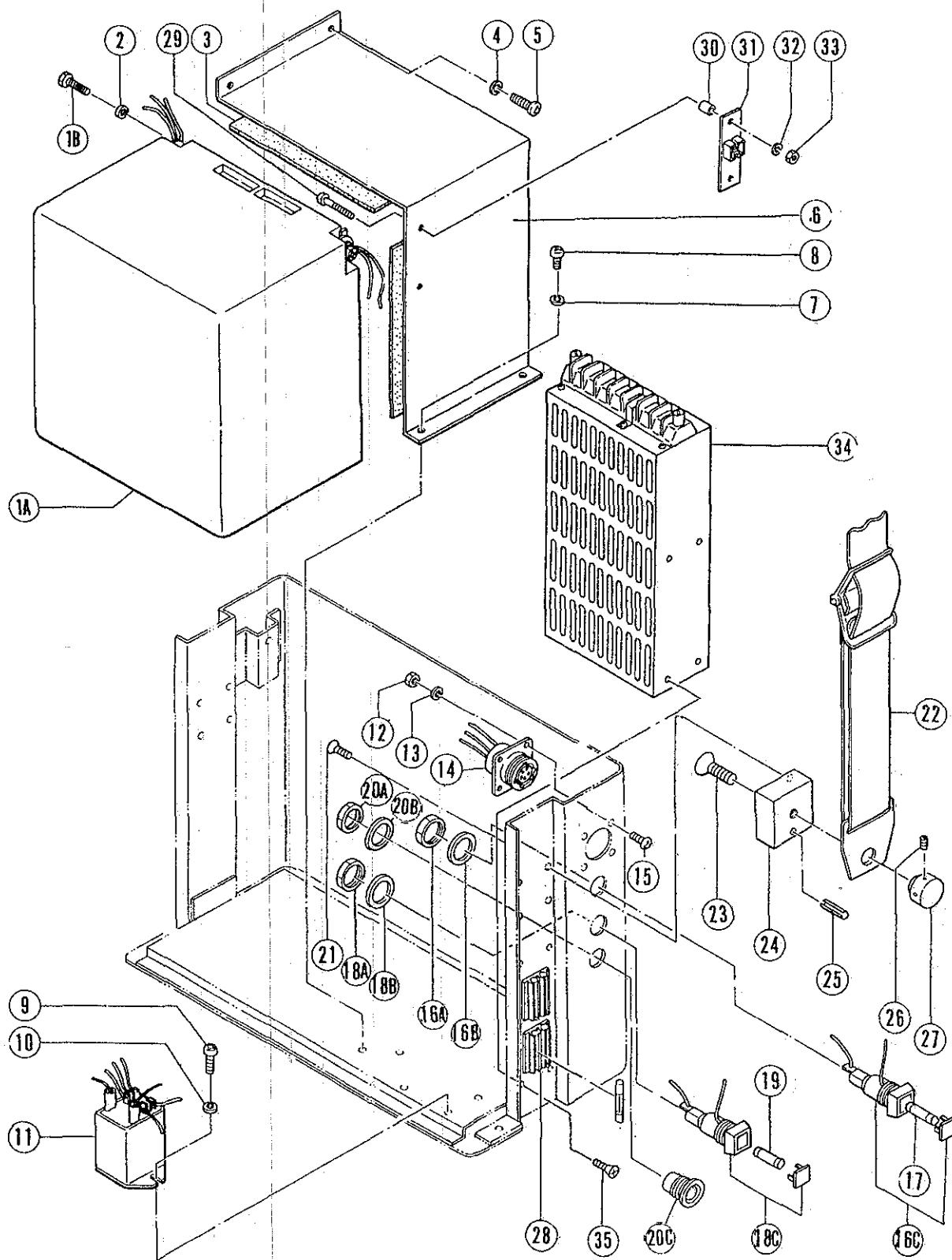
Power Pack - CM66P

[7] Battery Unit and Power Panel



<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
1.	Power cord	804 - 0206
2.	Power cord retaining band	804 - 0207
3.	Power cord bushing	804 - 0208
4.	Power panel	804 - 0201
5.	Truss head screw M3x8	202 - 0308
6.	Connector 10P (socket)	804 - 0212
7.	Connector 10P (plug)	804 - 0213
8.	Terminal	804 - 0211
9.	Spring washer ϕ 3	021 - 0300
10.	Oval head screw M3x20	222 - 0320
11.	Power switch	804 - 0205
12.	Charging indicator	804 - 0202
13.	Spring washer ϕ 3	021 - 0300
14.	Nut MS	002 - 0500
15.	Check button assembly	804 - 0204
15A	Check button body	
15B	Spring washer	
15C	Nut	
16.	Unit body frame gasket	804 - 0104
17.	Side plate (A)	804 - 0101
18.	Side plate (B)	804 - 0102
19.	Counter-sunk screw M4x6	231 - 0406
20.	Bottom frame mount plate	804 - 0103
21.	Truss head screw M3x8	201 - 0308

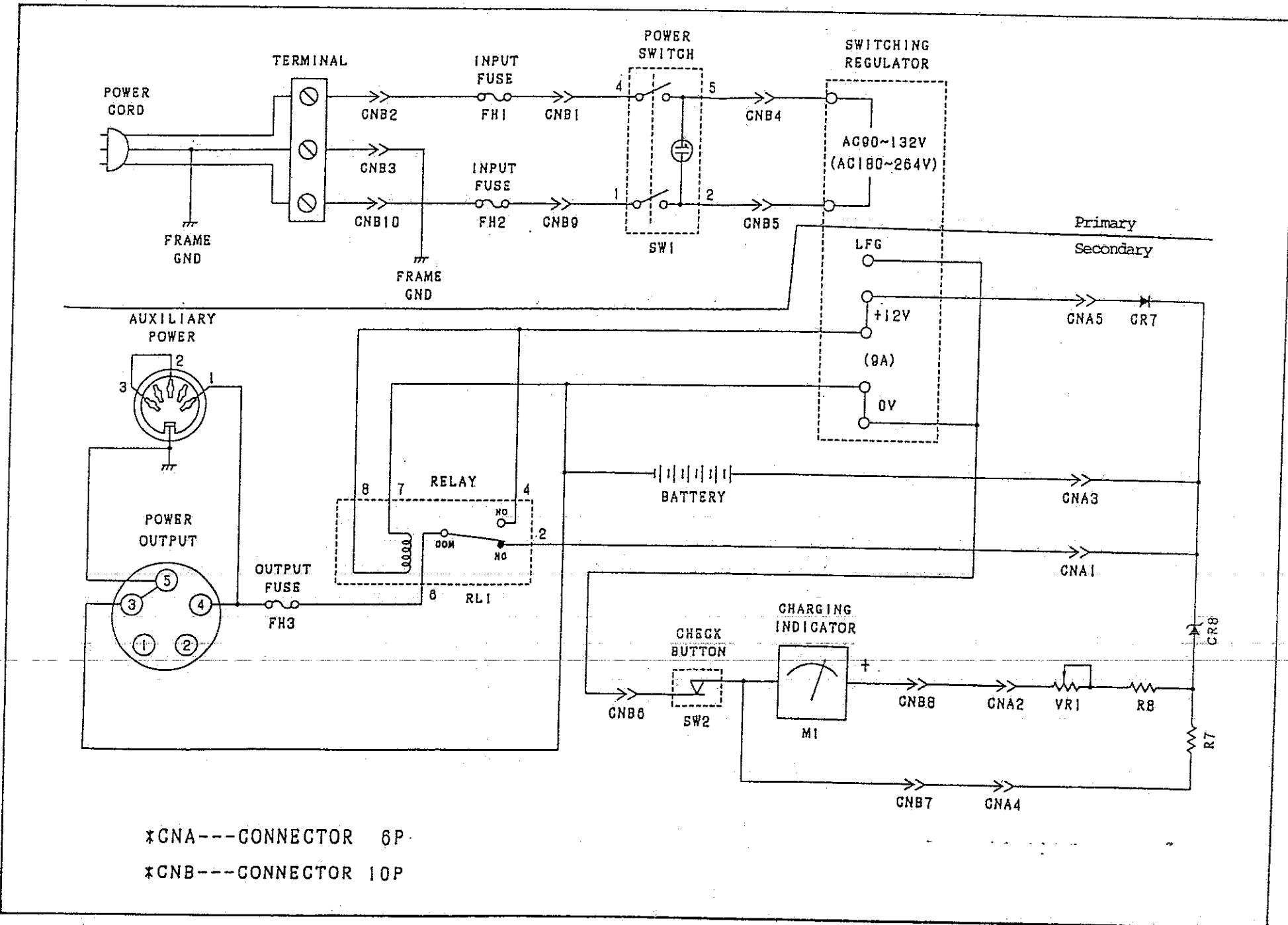
[8] Battery and Components



<u>No.</u>	<u>Part Name</u>	<u>Part No.</u>
1.	Battery assembly	804 - 0301
1A	Battery	
1B	Hex-head bolt	
2.	Battery terminal washer	804 - 0302
3.	Battery retaining rubber	804 - 0303
4.	Spring washer $\phi 4$	021 - 0400
5.	Bind screw M4x8	212 - 0408
6.	Battery retaining plate	804 - 0304
7.	Spring washer $\phi 4$	021 - 0400
8.	Bind screw M4x8	212 - 0408
9.	Bind screw M4x8	212 - 0408
10.	Spring washer $\phi 4$	021 - 0400
11.	Relay	804 - 0310
12.	Nut M3	002 - 0300
13.	Spring washer $\phi 3$	021 - 0300
14.	Power outlet receptacle	804 - 0311
15.	Truss head screw M3x10	202 - 0310
16.	Power out fuse holder assembly	804 - 0312
16A	Nut	
16B	Plain washer	
16C	Fuse holder body	
17.	Power out fuse	804 - 0313

Service Manual

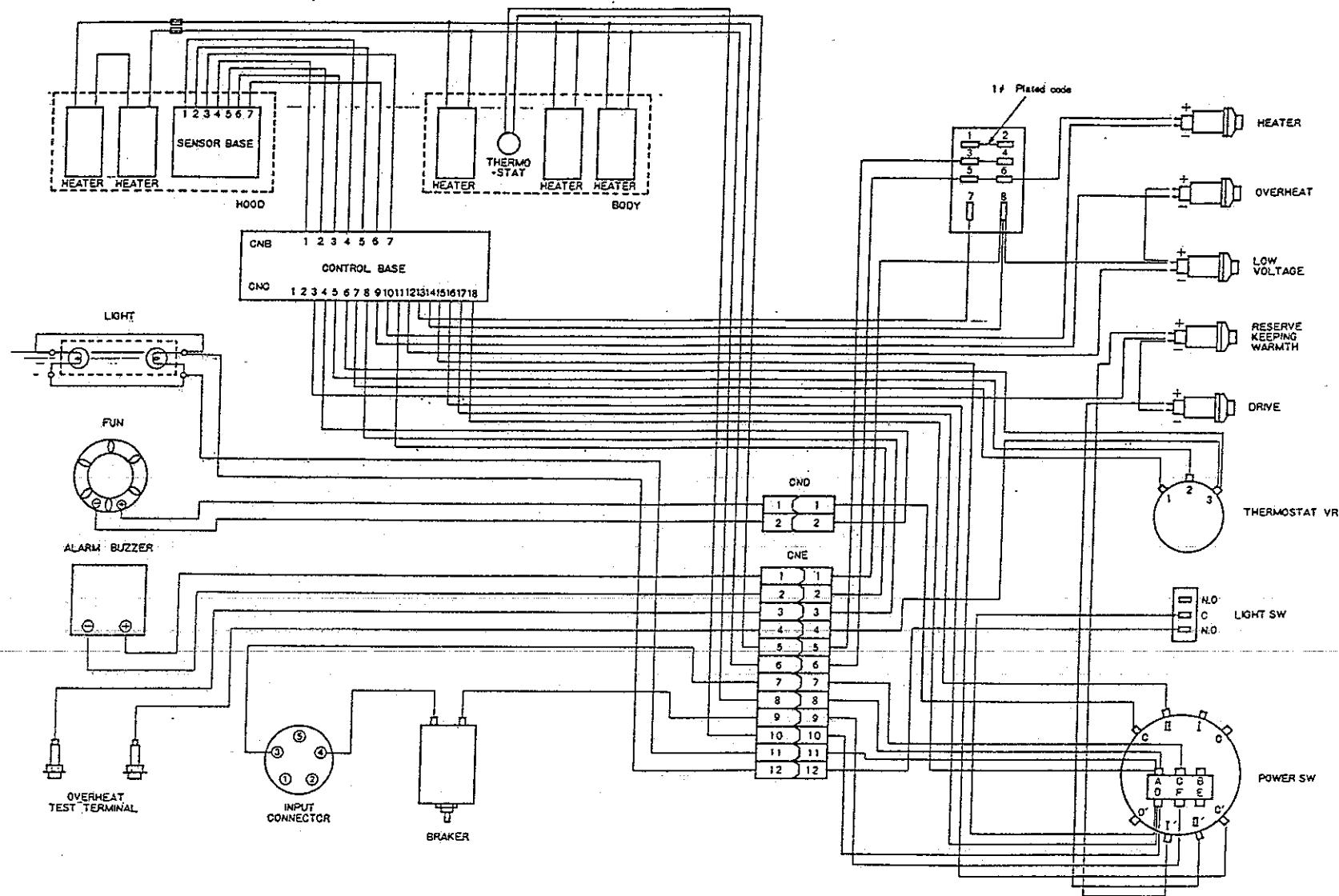
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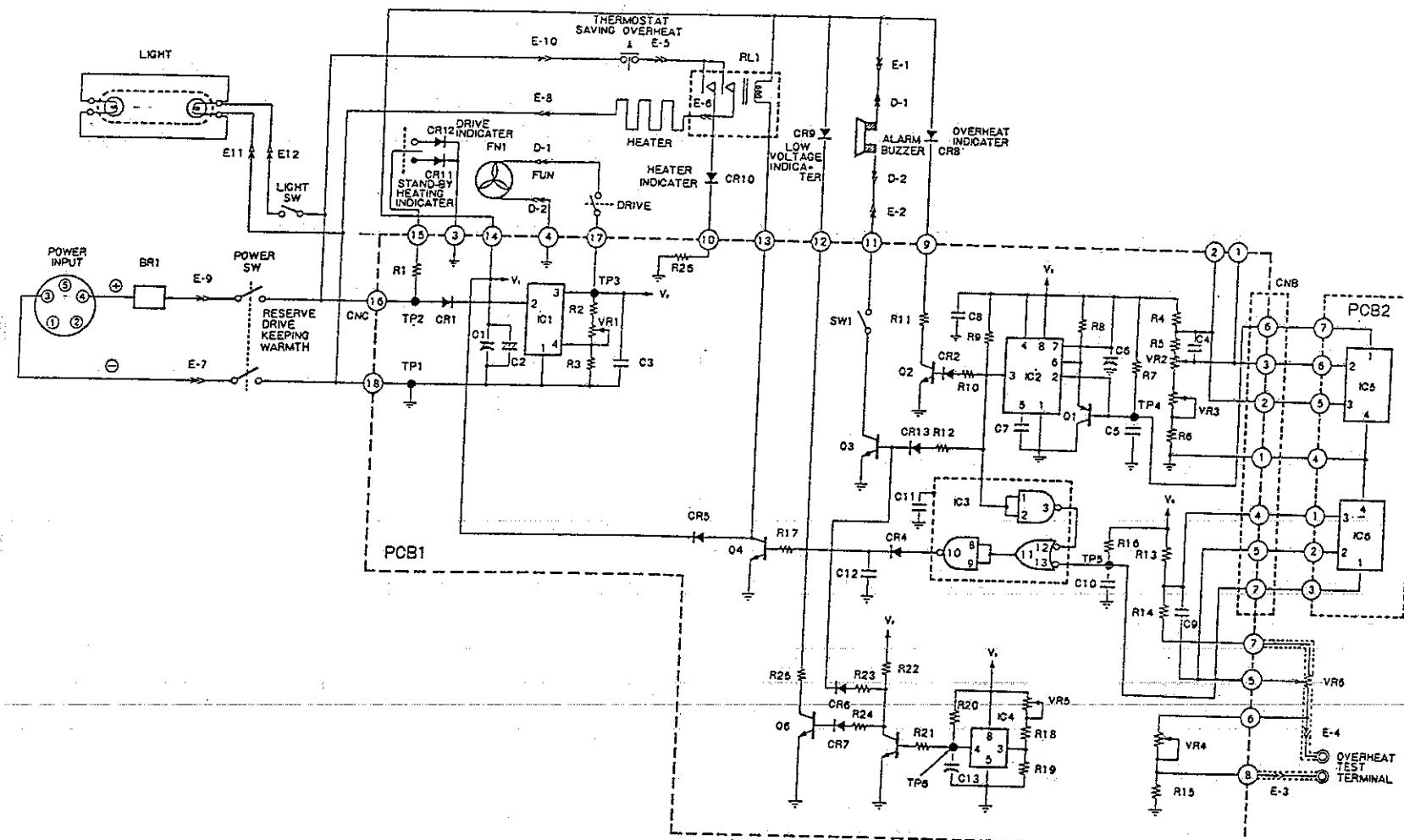
*CNA---CONNECTOR 6P

*CNB---CONNECTOR 10P

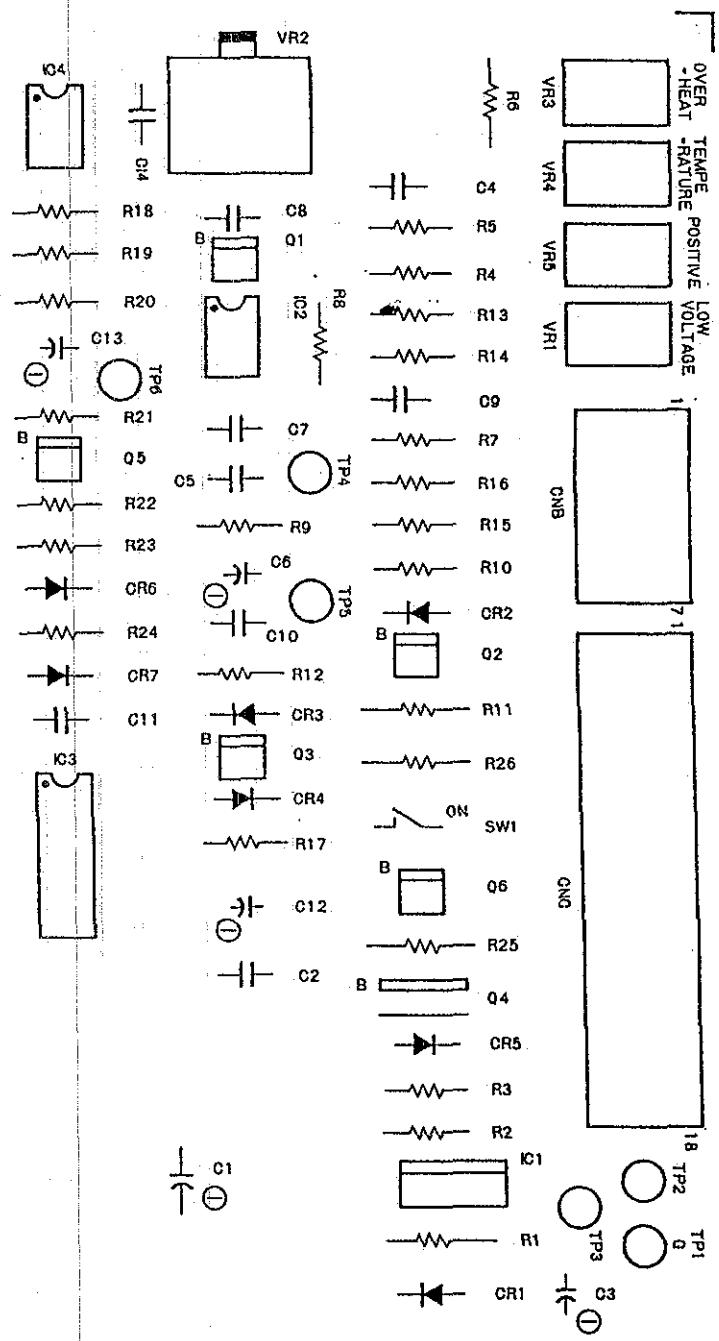
V-80_{TR} FIXED LIGHT TRANSFORM CAPSULE



V-80TR FIXED LIGHT TRANSFORM CAPSULE DIAGRAM



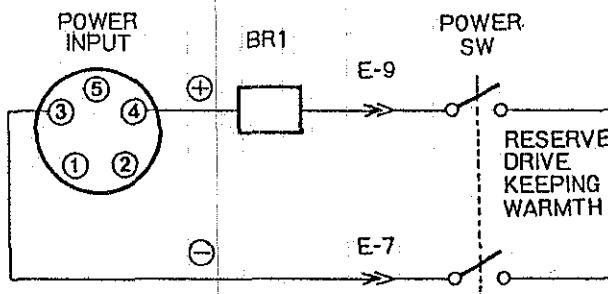
L V-80_{TR} PCB-IA



V-80_{TR} FIXED LIGHT TRANSFORM
CAPSULE PARTS LIST

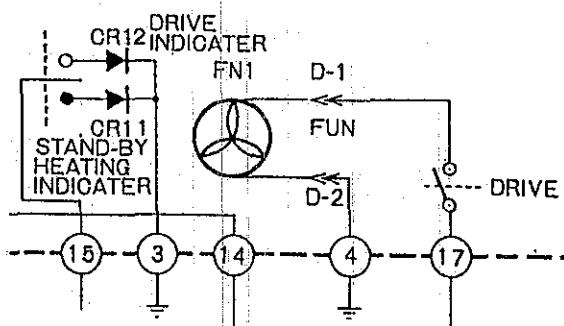
V-80TR CIRCUIT DESCRIPTION AND ADJUSTMENT PROCEDURE

1. Power Supply



The power source for operating the V-80TR is 12V DC only. Power input connector pin #4 is + and pin #3 is -.

2. Power Switch Modes

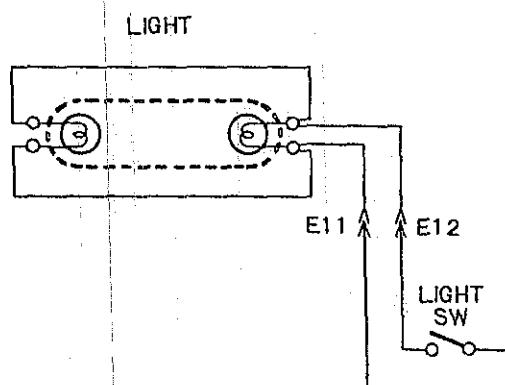


The power switch can be set in either of two modes; the first, the STANDBY HEATING mode, the second the OPERATE mode.

In the STANDBY HEATING mode, the standby heating indicator lamp will light and all electrical components except for the fan will be energized. This mode is primarily used for warm-up operation.

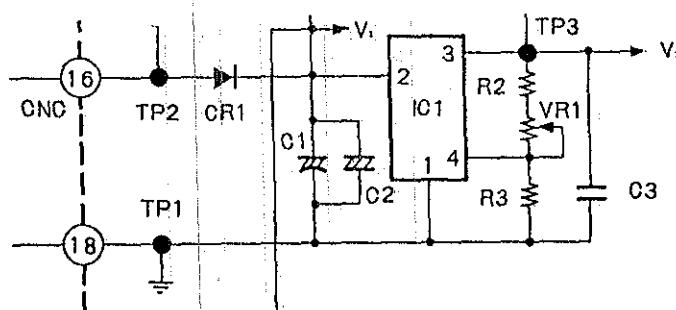
In the OPERATE mode, the operating indicator lamp will light and all the electrical components will be energized. This mode is used for normal incubator operation.

3. Illumination Lamp Switch



The illumination light can be operated in either power switch position. Turning its power switch to OFF will cause the light to go out even when the illumination lamp switch is switched to ON.

4. Constant-Voltage Power Supply



The IC 1 is an IC circuit for the constant-voltage regulator and will stabilize the voltage from an unregulated power source such as batteries. Its

purpose is to ensure predictable power control circuit operation.

TP2 (V_1): Unstable DC power voltage.

TP3 (V_2): Stabilized 8.5V DC voltage.

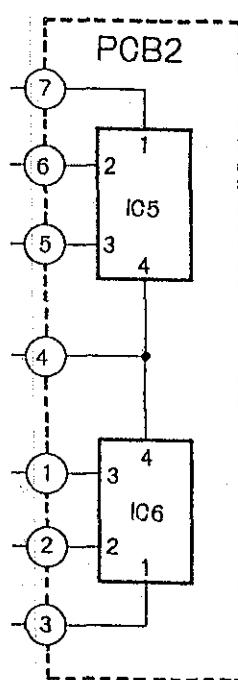
VR1 Adjustment

Adjust VR1 for 8.5V at TP3 (V_2).

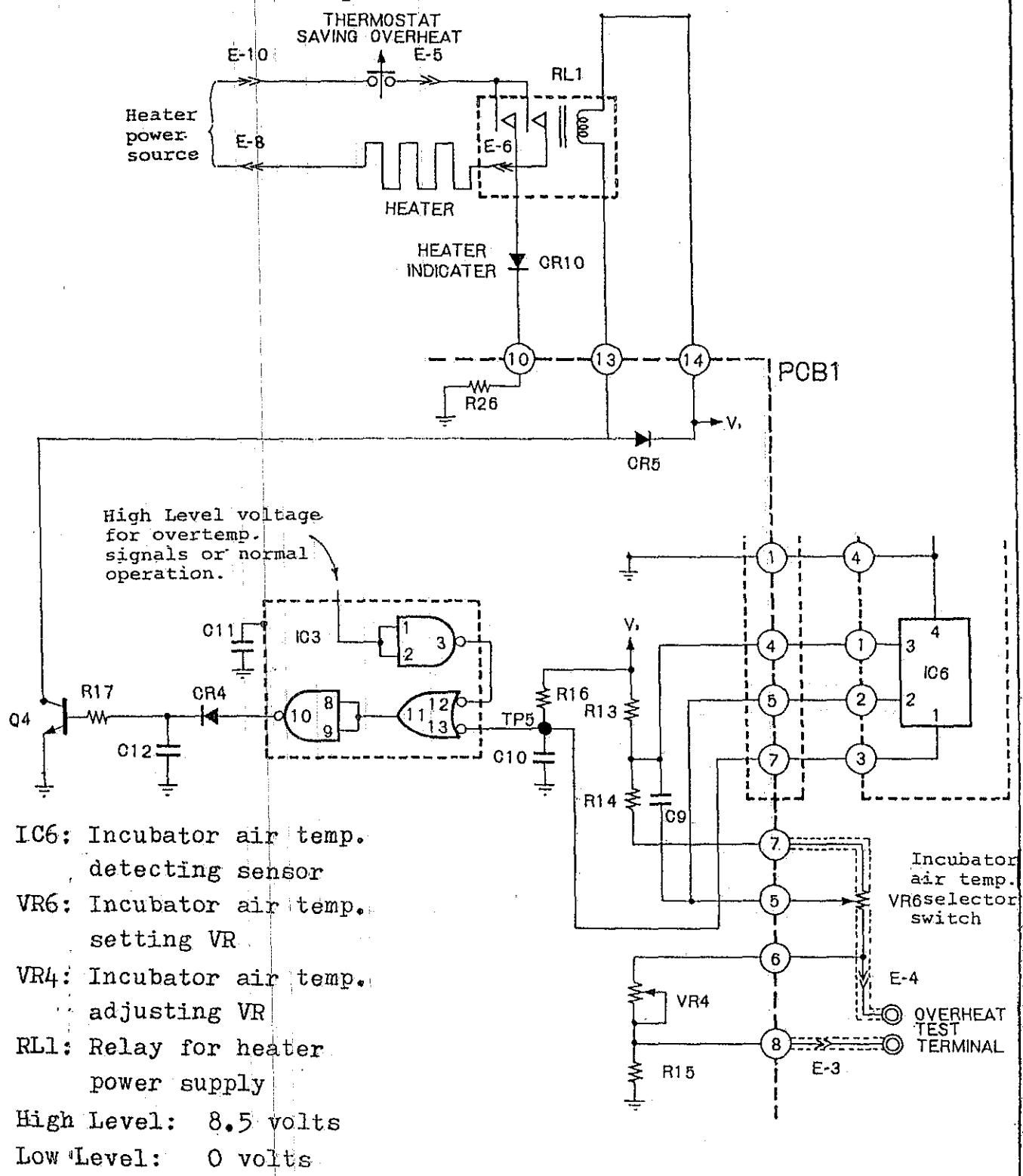
5. Temperature Sensor

Both the IC5 and IC6 are IC circuits for the temperature sensor. The V-80TR uses IC5 to detect overtemperature conditions (incubator air temperature: 38°C) and IC6 is used to detect incubator air temperature. The numbers and functions of the IC5 and IC6 pins are shown in the figure below.

- 1. Output
- 2. Input
- 3. +V
- 4. -V



6. Incubator Air Temperature Control Circuit



The incubator air temp set values are numerically indicated on the incubator panel. The following table lists the relationship between switch settings and incubator air temperature.

Approximate relationship between switch settings and incubator air temperature (at 20°C room temperature)

Switch setting	2	3	4	5	6	7	8	9	10
Incubator air temp. (°C)	29	30	31	32	33	34	35	36	37

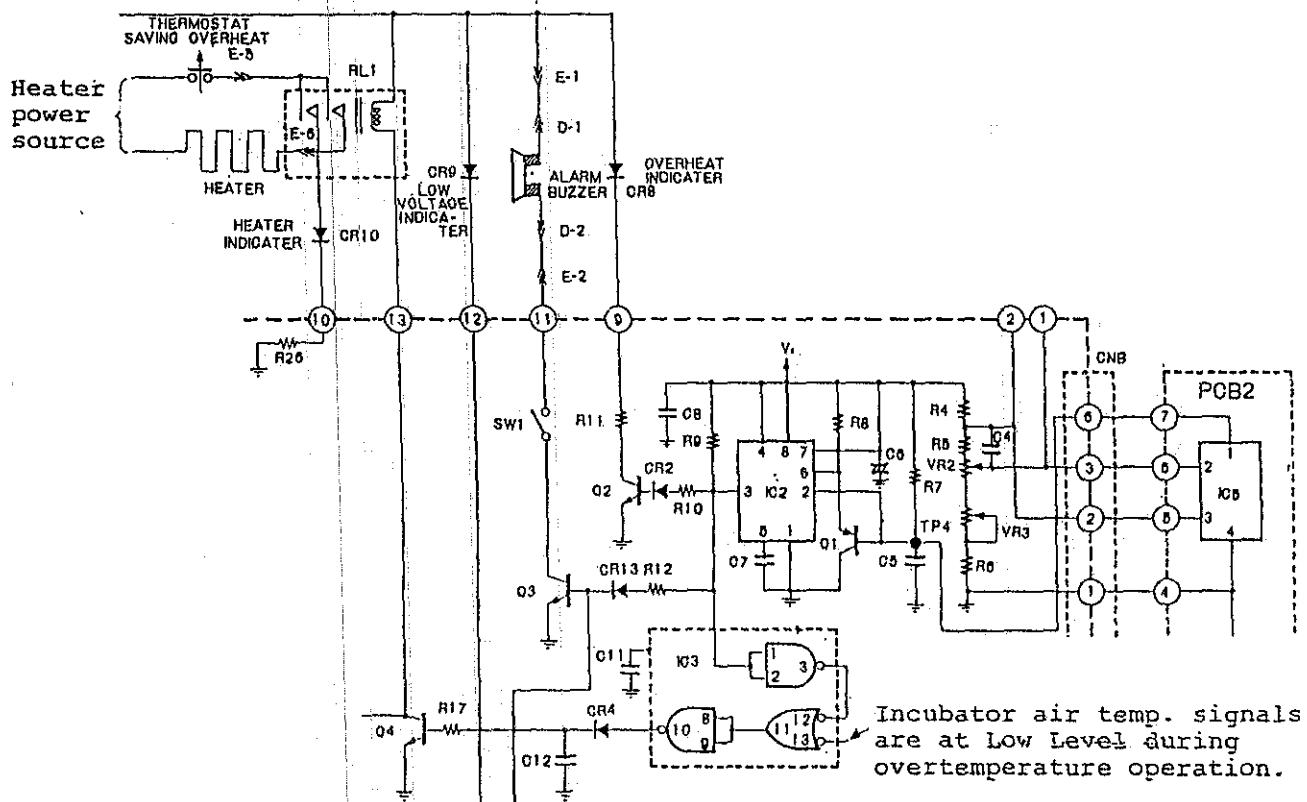
If the IC6 senses a lower incubator air temperature than the value set by the VR6, this will cause the voltage at TP5 and IC3 pin #10 to change to High Level. This increased voltage level applied to IC3 pin #10 will in turn cause the Q4 transistor and the RL1 relay to be turned ON in sequence and result in power to the heater. Conversely if the IC6 detects a higher incubator air temperature, this will cause the voltage both at TP5 and at IC3 pin #10 to change to Lower Level. This Low Level voltage at IC3 pin #10 will cause the Q4 transistor and the RL1 relay to be turned OFF in sequence and shut off the heater power. Capacitor C12 is incorporated to prevent relay chattering. The CR5 clips a spike which otherwise would be generated by turning ON and OFF of the relay armature winding.

VR4 Adjustment

Turn VR4 counterclockwise when the incubator air temperature remains lower than the set value.

7. Alarm Circuits

7-1 Incubator air overtemperature protection circuit



- If the IC5 senses 38°C incubator air temperature, this will cause the voltage at TP4 to change to Low Level and the voltage at IC2 pin #3 to change to High Level. The High Level voltage at IC2 pin #3 will in turn cause Q2 and Q3 transistors to be turned ON. With Q2 and Q3 on, the overtemperature indicator lamp will light and the overtemperature buzzer sound.

At the same time, Q4 and the RL1 will be turned OFF and the heater power will be disconnected. The IC2 circuit prevents relay chattering when subjected to an over-temperature condition.

The SW1 switches the alarm buzzer to ON or OFF.

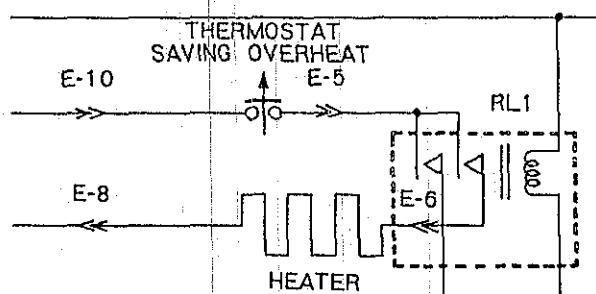
VR3 Adjustment

If the incubator air temperature does not reach 38°C, set the VR2 to the mid-point position and adjust VR3 clockwise.

VR2 Adjustment

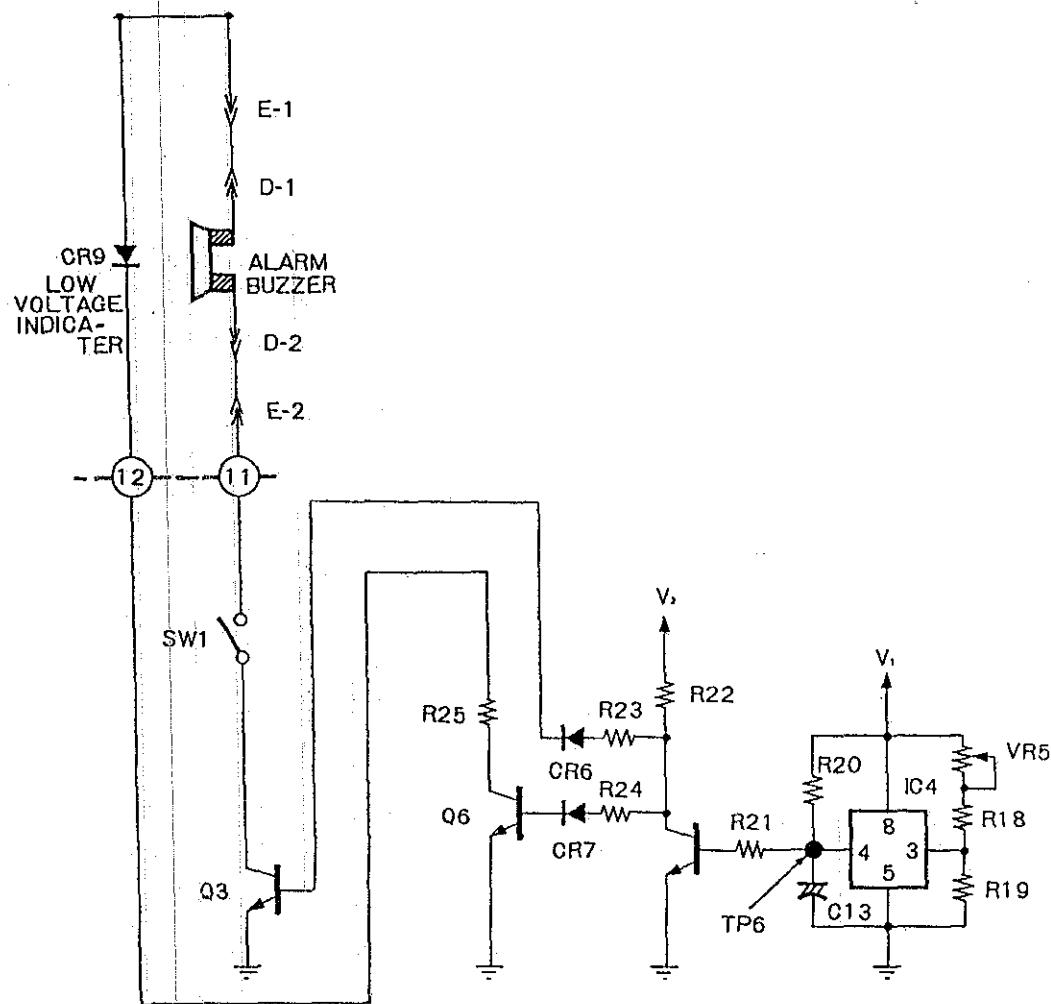
The VR2 should be used only when an overtemperature setting adjustment is made externally with the power unit in normal operating condition. If the incubator air temperature does not reach 38°C, turn VR2 clockwise. Prior to making VR2 or VR3 adjustments, short-circuit the overheat test terminal and turn the incubator air selector switch to a fully clockwise position.

7-2 Overheating of heater safety thermostat



The safety thermostat installed in the heater element will disconnect the heater current should the heater surface temperature exceed 80°C. In such an instance, current will not flow to the heater even though the heater power relay is closed (ON).

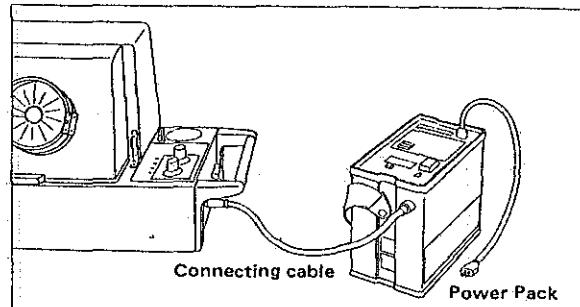
7-3 Low-voltage alarm circuit



The IC4 is an IC circuit which monitors the power voltage of V_1 . If the power supply voltage drops below 9.6V, the voltage at the IC4 pin #4 will be Low Level. The Low Level voltage at the IC4 pin #4 will cause Q5 to be turned OFF and Q3 and Q6 to be turned ON resulting in the low-voltage alarm indicator light to come on and the alarm buzzer to sound.

VR5 Adjustment

Adjust VR5 so that the Low Level voltage appears at TP6 when V1 is 9.6 volts.



Note: Due to the line voltage drop in the connecting cable between the Power Pack battery source (10.7 volts) and the transcapsule, the limit value for the VR5 adjustment is 9.6 volts.

8. TROUBLESHOOTING

Check the following before requesting repair service.

Symptoms	Possible Causes
1. Operate indicator lamp on the incubator does not light.	(A) Power switch OFF. (B) Connecting cable not securely connected. (C) Circuit breaker OFF. (D) Power output fuse (blue, 8 Amp) of Power Pack blown. (E) Battery in Power Pack not fully charged. Depress battery check button to confirm. (Alarmed in case of continuous operation.) (F) Car plug improperly inserted into the cigarette lighter. (G) Fuse in the vehicle or car plug blown (For replacement of car plug fuse, refer to end of this section.)
2. Power switch on Power Pack does not light.	(A) Power switch on Power Pack OFF. (B) Power cable plug disconnected from power source. (C) Power input fuse (white, 2 Amp) blown.
3. Battery in Power Pack not charged.	(A) Power switch on Power Pack OFF. (B) Power cable plug disconnected from power source. (C) Charging fuse (yellow, 5 Amp) blown.
4. Incubator air temperature rises too high.	(A) Temperature control switch set at too high a temperature position. (B) Incubator left in direct sunlight or near a heat source such as a stove or radiator. (C) Over temperature test terminals short-circuited.
5. Incubator air temperature does not rise.	(A) Temperature control switch set at too low a temperature position. (B) Low battery voltage.
6. Oxygen concentration does not rise.	(A) Oxygen cylinder empty. (B) Check flow rate on oxygen flowmeter. (C) Connecting hose disconnected.
<ul style="list-style-type: none"> If all the above-listed checks fail to identify the malfunction, the unit should be considered as being out of order and in need of repairs. Indicate by a sign on the incubator that the unit is "OUT OF ORDER", and contact your ATOM distributor. <p>Identify the model name, date of manufacture, serial No. and describe the difficulty being experienced so that countermeasures can be taken quickly.</p>	

Car plug fuse replacement

Unscrew the cap from the end of the car plug and remove the 10-A fuse.

Replace the fuse with new one if it is blown. After the new fuse is in position, securely screw the cap into the car plug.

